

# *M2M Primer*

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*Overview of M2M and market challenges*

*6/10/2010*

## *M2M Introduction*

*A recent Industry M2M industry report stated thus:*

There is a silent revolution going on, and it's happening right under our noses!!

All around the world, connectivity is being embedded into devices we encounter almost daily, fundamentally changing the way we live, work and play. Industrial equipment that once required expensive, on-site servicing can now be monitored, updated, diagnosed, and repaired remotely. Smart grids that monitor energy usage and automatically send alerts when problems arise enable our communities to use energy more efficiently. Connected sensors embedded along gas lines help protect our public safety and the environment by immediately detecting leaks and sending out alerts.

Telematics services embed connectivity in our cars, helping to protect us in case of accident and our vehicles against theft, while giving us access to concierge services wherever we are. Our homes are connected now, too. Security systems that used to just sound alarms now automatically control temperature by turning heating and air conditioning systems on and off.

*Welcome to the World of M2M and Connected devices!*

*So what is M2M or to be specific Cellular M2M?*

*An ABI research report<sup>1</sup> describes M2M as below:*

The market that we call “M2M” is broadly diverse and consists of many technologies and applications that enable machines and other traditionally non-computing remote devices and sensors to interconnect with back-end IT infrastructure in a largely automated fashion. These technologies consist of both wired and wireless communications and include both SRW (Short-Range Wireless), such as ZigBee and RFID, in addition to WAN, such as cellular. The focus of this report is on cellular M2M, therefore representing a subset of the overall M2M market.

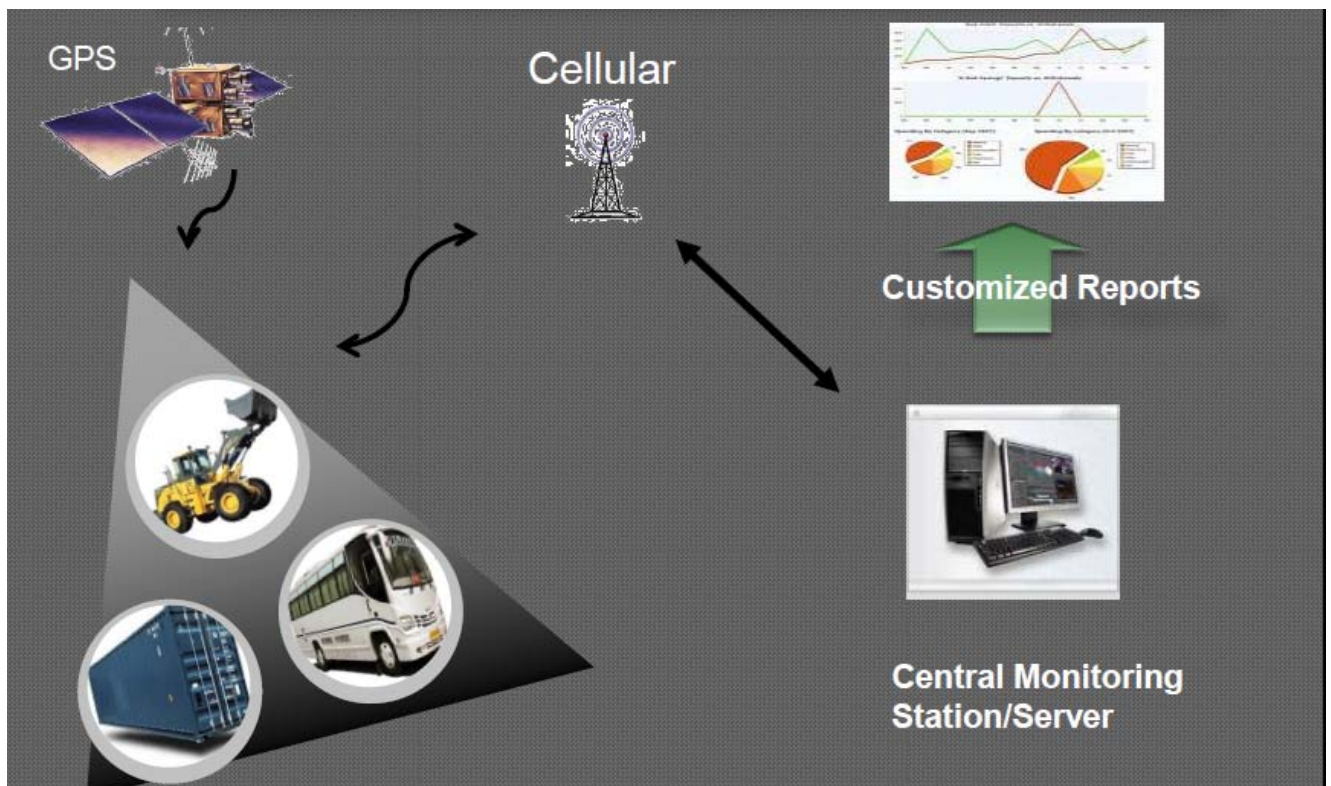
Another key point is that applications we call cellular M2M, in many cases, have been around for a number of years under different names. For example, fleet management systems, some OEM consumer Telematics applications, and general remote telemetry readings of oil and gas fields, have existed at least since the early to mid-1990s. However, these applications are rarely called M2M, as this term is a recent addition to the market nomenclature used to describe a broad set of applications that, individually, have been known by

other names. In general, the broad set of cellular M2M applications are commonly regarded as a fairly nascent market, in large part due to the extremely fragmented and low shipment volumes of many of these entities to date.

*Looking from an evolution point of view, M2M systems are extensions traditional or legacy Telemetry/SCADA systems that now connect via wireless be it through short range PAN (ex Bluetooth, low power RF, Zigbee) or long range WAN/MAN (Cellular, WiFi, Satellite). Much of the importance to M2M stems from the fact that cellular connectivity has become ubiquitous and very affordable. (Data plans as low as \$3 per month are now available even in the US for M2M telemetry devices)*

*Let us look at 2 classic examples to understand how a M2M system works*

### Classic Example 1: Vehicle/Asset Tracking System



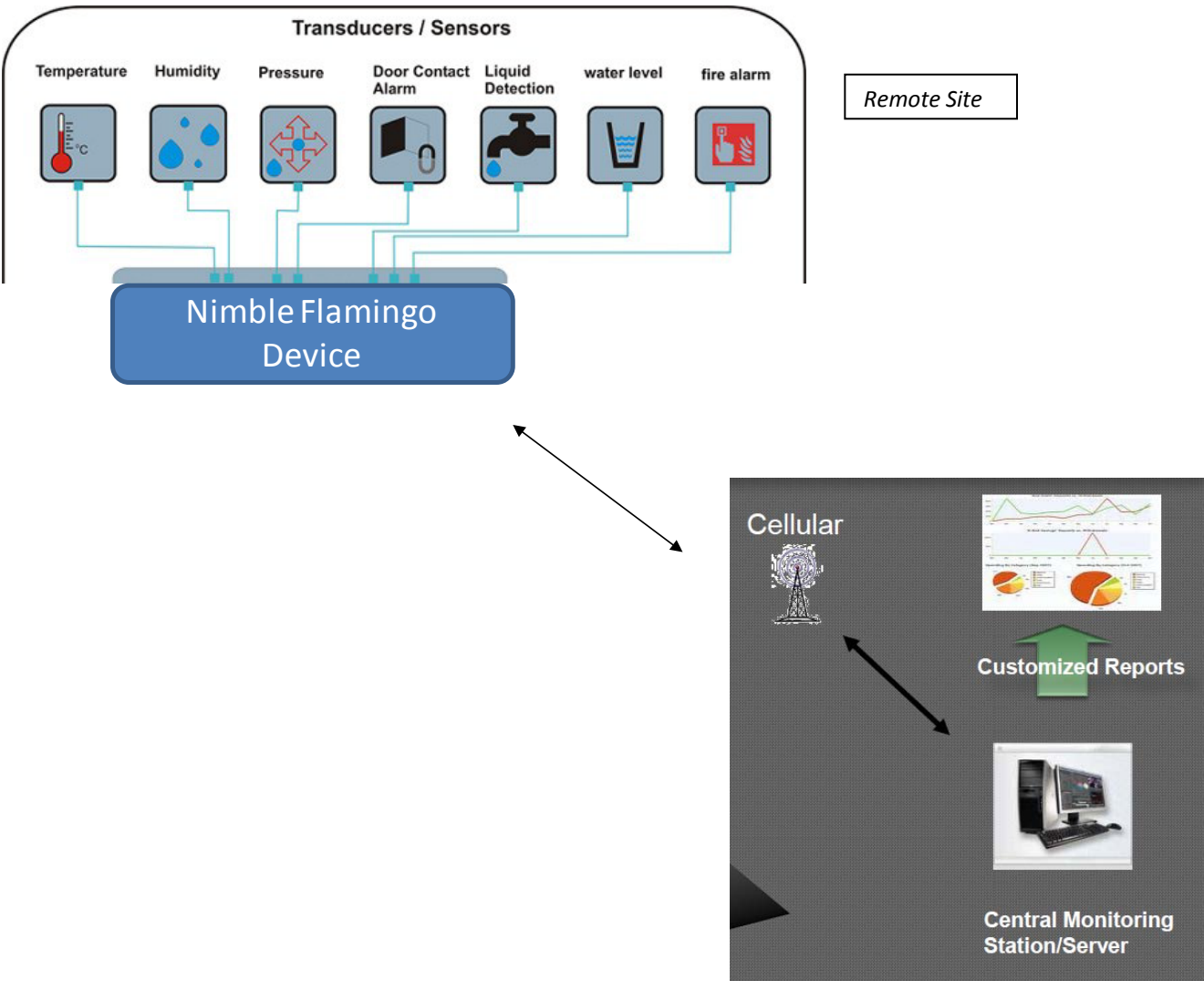
*In this, vehicles/Assets are fitted with tracking devices that are GPS enabled and transmit location and other pertinent vehicle parameters to the back end server via TCP/UDP*

*connection thru the cellular data network (GPRS/CDMA1xRTT). The back end server runs advanced Fleet management software that fleet managers can connect to from a standard browser from anywhere in the world and monitor their fleet and their parametrics. The server and/or the devices are also capable of sending SMS alerts to the server or to a user mobile when certain pre-defined events happen or fail or happen. One popular alert is a GeoFence violation alert where the Fleet manager defines a GeoFence (Geographic boundary) for a vehicle and upon entering or exiting the fence, the device sends a TCP alert back to the server or a SMS alert directly to the user mobile. For example, Nimble' s Pelican family of track and trace devices feature upto 6 independent Geofences, Motion, Zigbee and Temperature sensors allowing fleet/Asset/IT managers flexibility in terms of defining daily/weekly alerts.*

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Classic Example 2: Remote Monitoring System



*In this case, the telemetry data from a remote system (be it a Telecom Tower power system, Solar farm, Agricultural Irrigation system or an Electric Utility system) are monitored and/or controlled by the server at HeadQuarters or the Data center or NOC (Network Operations Center). Critical parameters of the remote system can be monitored round the clock and preventive maintenance carried out based on this. This helps in reducing downtime and overall OPEX/CAPEX costs of the remote system. Nimble’s Flamingo family of monitoring solutions coupled with the user friendly backend software offer a wide*

*variety of features relating to monitoring various physical parameters and user friendly data presentation at the Data Center.*

*Opportunities for several hundreds of applications like the 2 described above exist in various verticals such as Healthcare, Construction, Utilities, Transportation & Supply chain and Logistics, Public Infrastructure and many more. While we at Nimble believe the time for M2M has come, there are several challenges hindering widespread market adoption of M2M.*

### *M2M Market Adoption Drivers and Challenges<sup>1</sup>*

While the cellular M2M market is characterized by a high degree of market fragmentation, with different vertical markets each having their unique set of market adoption drivers and challenges, key factors represent both drivers and challenges for cellular M2M market.

Key market adoption drivers and enablers for the cellular M2M market as a whole include:

- Cellular network coverage being expanded worldwide.
- Telematics and telemetry increasingly seen as sources of greater operational efficiency and increased incremental revenue.
- Cellular M2M applications benefit from R&D and the scale of the mobile handset industry.
- Technical advances in air interface standards enable new 3G M2M market segments.
- Mobile operators seeking to expand their data service offerings.
- Government mandates increasingly requiring the use of telematics and telemetry functionality.

Key market adoption challenges and inhibitors for the cellular M2M market as a whole include:

- Application developer knowledge and experience of cellular M2M is still limited and substantial customer support is often required.
- Many cellular M2M applications can be complex to develop and deploy, especially for companies whose core businesses are in non-technical areas.
- The cost of cellular M2M solutions can be an inhibitor for some applications.

- Third-generation M2M applications are dependent on the deployment of 3G cellular infrastructure by MNOs (Mobile Network Operator).
- Many applications have a limited need for high throughput 3G connections.

1. ABI Research Report - Cellular M2M connectivity Service Providers - The market opportunity for MNOs, MMO' s and MVNO' s